

Chapter 7 The Skeleton

Overview

There are 206 bones in the body. The skeleton is divided into two divisions:

1. Axial skeleton
 - a. Skull
 - b. Vertebral column
 - c. Bony thorax (rib cage & breast bone)
2. Appendicular skeleton
 - a. Pectoral girdle and upper extremity
 - b. Pelvic girdle and lower extremity

The Axial Skeleton

The skull has two general regions: the CRANIAL bones and the FACIAL bones. The CRANIAL bones, of which there are 8, surround the brain. They serve as muscle attachment sites and protect the brain and organs of hearing & equilibrium. The FACIAL bones, of which there are 16, form the framework of the face. They protect the sensory organs, allow for openings for the passage of food and air, secure the teeth and provide attachment sites for the facial muscles.

Cranial Bones

FRONTAL BONE (forehead)

PARIETAL BONE (Left and Right). The bones on the side of the head. There are four sutures where the parietal bone meets other bones.

- **Coronal suture** is where parietal bone meets the frontal bone
- **Sagittal suture** where the two parietal bones meet
- **Lamdoidal suture** where the parietal bones meet the occipital bone
- **Squamous suture** where the parietal bones meet the temporal bones

OCCIPITAL BONE

The distinguishing feature of the occipital bone is the **foramen magnum**.

TEMPORAL BONES (Left and Right)

This one is recognizable by a big projection called the **zygomatic process**. Underneath the TB are two big canals...the **carotid canal** and the **jugular foramen**. This is also where you will find the **external acoustic meatus** and the **internal acoustic meatus**.

SPHENOID BONE sits in the center of the head. It is the only cranial bone that touches all other cranial bones...it is the cornerstone bone! It forms the back side of the eye

Margin = edge
Foramen = hole
Sinus = empty space
Sutures = joints
Parietal = wall
Condyle = "rocker" surface
Protuberance = juts out
F words = push in
T words = project out
Process = sticks out toward something else
Fossa = valley or depression
Tubuculum = bump
Fissure = wide canal

socket. The sella tursica is a “saddle-like” surface surrounding the pituitary gland. The pituitary gland sits in the hypophyseal fossa, which is a “space” enclosed by the sella tursica.

There are THREE FORAMEN on the spine of the SPHENOID bone.

- 1) foramen rotundum
- 2) foramen ovale
- 3) foramen spinosum

ETHMOID BONE is another bone that is not on the surface. If you pinch your nose between the eyes you might be able to feel it...it's deep. It sits in front of the sphenoid bone and at the top of the nasal cavity and has a lot of holes and air, which are the ethmoid sinuses.

Facial Bones

MANDIBLE is the jaw bone. The mandible begins as two bones that fuse around age 20. There are two foramina on the mandible...the mental foramen and the mandibular foramen.

MAXILLA (Right and Left) is the upper jaw. It is connected via joints.

The alveolar margin is where the teeth sit.

The incisive foramen is a hole behind the front teeth.

The inferior orbital fissure is between the maxilla and the sphenoid bone.

ZYGOMATIC BONE is the cheekbone. (LR, no differentiation)

NASAL BONE

INFERIOR NASAL CONCHA (LR, no differentiation)

LACRIMAL BONE's defining feature is the lacrimal fossa. (LR, no differentiation)

PALATINE BONE is the back part of the hard palate. It is L-shaped and paired.

VOMER BONE protrudes into the nasal cavity and forms the back part of the septum.

HYOID BONE is near Adam's apple. Its distinguishing feature is that it does not articulate with any other bone. It is an attachment site for lots of muscles.

Vertebral Column - 5 Major Regions

1. Cervical (7 vertebrae)
2. Thoracic (12 vertebrae)
3. Lumbar (5 vertebrae)
4. Sacrum (5 fused vertebrae as one bone)
5. Coccyx (3-5 fused vertebrae as one bone)

General appearance of vertebrae:

Breakfast at 7	7 Cervical Vertebrae
Lunch at 12	12 Thoracic Vertebrae
Dinner at 5	5 Lumbar Vertebrae

CERVICAL VERTEBRAE

The distinguishing feature of cervical vertebrae are the holes in the transverse processes (these are transverse foramen.) In C2-C6, the distinguishing feature are the bifid spinous processes, forked tongue appearance.

- ATLAS (C1) carries the head. It has no “body” and no spinous process.
- AXIS (C2) has the “body” of C1. It becomes attached to C2 and forms an axis around which C2 can rotate.

THORACIC VERTEBRAE look like giraffes. The distinguishing feature of thoracic vertebrae are long spouty spinous processes and indentations where ribs meet the bone (facets and demi-facets).

LUMBAR VERTEBRAE look like moose. The distinguishing feature of lumbar vertebrae are the short and stout spinous processes and big body.

The SACRUM is 5 fused vertebrae in a triangular shape.

The COCCYX is at the base of the sacrum.

Bony Thorax

This area is composed of the sternum and 12 pairs of ribs. The first seven are the TRUE RIBS because they connect to the sternum via their own cartilage. Ribs 8-12 are the FALSE RIBS because they share cartilage to connect to the sternum. Ribs 11 & 12 are further classified as FLOATING RIBS because they do not attach to the sternum at all.

The Appendicular Skeleton

The PECTORAL GIRDLE attaches the upper limbs to the axial skeleton. It is an attachment point for muscles that move the upper limbs. The pectoral girdle sacrifices stability for motility. The UPPER LIMBS are used for manipulation of our environment and are specialized for mobility.

Bones of the Pectoral Girdle (2)

The CLAVICLE is the collar bone. It is S-shaped from the superior/inferior view. It's distinguishing feature is that the acromial end is flat-ish and the sternal end is round-ish. The top is smooth and the bottom has bumps. The convex curve is more medial...it bows out toward the sternum.

The SCAPULA lie on the dorsal surface of the rib cage.

Bones of the Upper Extremity

The HUMEROUS is the upper arm bone. The rounded head is medial.

The RADIUS & ULNA are the lower arm bones. The radius is lateral and the ulna is medial. Viewed sideways the ulna has a “U”. Look for the C shape...it points forward. You can also see a notch where the radius fits in on the lateral side. The anterior side is smoother than the back side.

The HAND will always be shown in the palmar view. The carpal bones (wrist) are actually at the heel of the hand. There are two rows of four bones.

Some	Scaphoid
Lovers	Lunate
Try	Triquetral
Positions	Pisiform
That	Trapezium
They	Trapezoid
Can't	Capitate
Handle	Hamate

The METACARPALS are the bones in the palm of the hand. They are numbered 1-5, starting with the thumb. The PHALANGES are numbered 1-5, starting with the thumb. The thumb has only proximal and distal phalanges. The other fingers have three, proximal, medial and distal.

Pelvic Girdle & Lower Extremity

The PELVIC GIRDLE attaches the lower limbs to the axial skeleton and serves as an attachment point for muscles that move the lower limbs. Mobility has been sacrificed for stability. The LOWER LIMBS are designed for locomotion and weight-bearing.

Bones of the Pelvic Girdle

The Os Coxa are two bones that make up the pelvis. The Os Coxa is made up of three bones, though they are not separate. These bones are: 1) ilium, 2) ischium, and 3) pubis.

Bones of the Lower Extremity

The FEMUR is the bone of the upper leg. The back of the distal end scrolls back.

The TIBIA and FIBULA are the bones of the lower leg. The TIBIA is medial & larger, and the FIBULA is lateral & smaller. The TIBIA supports the knee, while the FIBULA forms part of the ankle joint and has many muscles attached to it.

The FOOT also has numbered phalanges (1-5 beginning with big toe). All but the toe have a proximal, medial and distal...the thumb has just the proximal and distal.

There are seven TARSAL bones. **Tall Californian Navy Medical Interns Lay Cuties**

<u>Tall</u>	Talus
<u>Californian</u>	Calcaneous
<u>Navy</u>	Navicular
<u>Medical</u>	Medial Cuneiform

**Interns
Lay
Cuties**

Intermediate Cuneiform
Lateral Cuneiform
Cuboid

Marieb, E. N. (2006). *Essentials of human anatomy & physiology* (8th ed.). San Francisco: Pearson/Benjamin Cummings.

Martini, F., & Ober, W. C. (2006). *Fundamentals of anatomy & physiology* (7th ed.). San Francisco, CA: Pearson Benjamin Cummings.